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ORIGINAL ARTICLE

WILEY PSYCHOPHYSIOLOGY

R wa a 8 8 a 8 8 8 t 8 8at g zat : E 8 y g 8a v 8

Gua a Ka g[1] W u C a g[1] L u Wa g[1] P g W[2] X a Z u[1,3,4,5,6]

[1] c P c ca a C c c P , B , C a

[2] B K La a L a a C a c P c , Ca a N a , B , C a

[3] B K La a B a a M a H a , P , B , C a

[4] K La a Mac P c (M E ca), P , B , C a

[5] PK IDG/McG I B a ca c , P , B , C a

[6] I P c ca a B a c c a N a , a , C a

C 8 a , P .D., c P c ca a C c c P , 5 a a , B , 100871, C a. E a : 104@ .c P , P .D, a : a @ a .c

Fu g at
Na a Ba c ca c P a C a; 973 P a , G a /A a N : 2015CB856400; Na a c c F a C a, G a /A a N : 31470979

A t a8t
C a c c a a a c c c a c c c a a a a ca c c c c . H , a a a c a c c c - c ca a . Pa c a ca c a - a a c a a a a a c c a a c (a a). B a a a ca c a c c c a c , a c . N a , c a N2a a a a a c c a c c , a a c . c - a a a c ca c a a - a c c a c a c c c .

KEYWORDS
c a c c , N2, a , a a a

1 INTRODUCTION

a c , . - c) (. ., , a , , c) a c c a a c . F a , a c ca ac . a . c a ca a c a c a a c H , a a a a , a a a c a a acc ca ac a c a a a - ac . O c a a (. ., ac a a). c a a c a c c c - c ca a . a a c a a c a- c c ca a c c c - a a a a a ca , a , a /

PSYCHOPHYSIOLOGY

(DLPFC) ... (ACC), ... DLPFC ... ACC ... N2 (220–380 ms) ... N400 ... EEG ... N2 (200–350 ms) ... N2 ... (4–8 Hz) ... ACC, PFC ... N2

2 METHOD

2.1 Pa t 8 a t

(11 ,
18 26)
B
A
D H
E P
C P

2.2 A a atu a at a

B
(1980)
40
20
20 A
7 7 P 57
A 40
20
44100 Hz (16) A
60 B A
E E 2 (E
E G IL). 500

2.3 D g a 8 u

Each
500 (F 1).
500
P

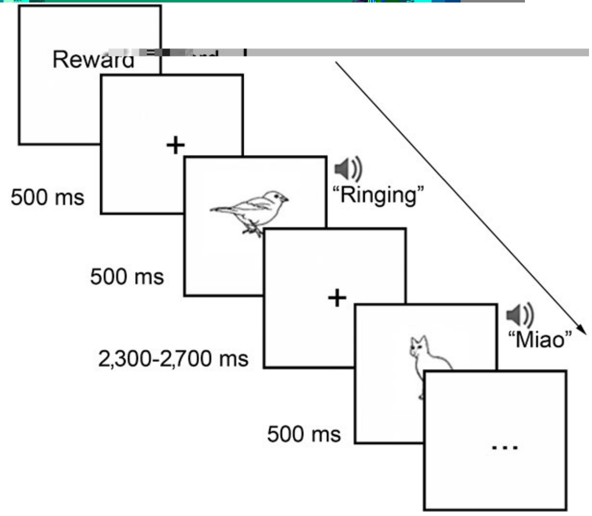

FIGURE 1 A
Each 500
500 P
1,500
800 1,200

A
800 1,200
A
$n+1=($ $n+$ $n)/2$ (., 2015).
2 (3 (
360 60
360

I , 60

A

P , 30

. P

(c c c)

I , .N

F

10 A , (. ., 1 c = 0.1 C),

. P 24

, 55 .

2.4 B av a ata a ay

O F , (1.4%

2. 3 (ANOVA),

I , B ANOVA (BANOVA;

M , & P c, 2012)

JA P (// -).

/

(. ., BF (BF$_{10}$)

(. .,

H_1:)

(. ., H_0:

). B c , $BF_{10} < 3$

$BF_{10} > 3$

(F , M , & K c, 2014,

., 2012). F , $BF_{10} = 10$

10

2.5 EEG 8 g a 8 g

EEG 64 A /A C

(E , B P G).

(P9, P10).

(EOG)

EOG

EOG

. A

5 . . EEG EOG

B A (B P G).

0.016 100 Hz,

500 Hz.

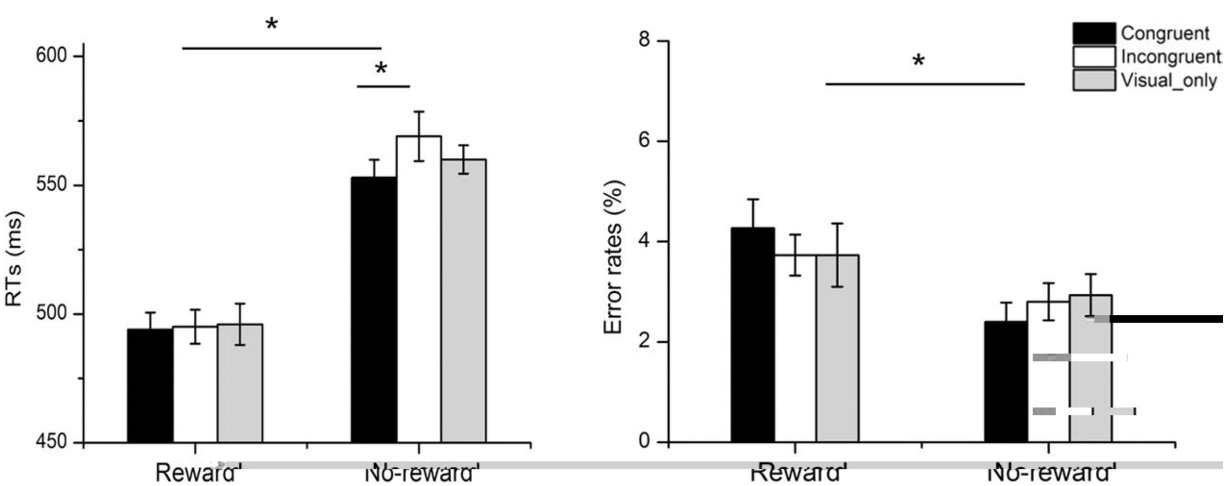

FIGURE 2 M ( ) (%;) (C , 2005) (*p < .05)

EEGLAB (D & Ma , 2004) EEG 0.5 Hz 30 Hz. Oc (J ., 2000).

2.6 ERP a ay

F E P 200 800 200 70 V 95.79% (96.22% , 97.44% , 97.37% ; 95.19% , 94.55% , 93.97%).

Acc (N2, 240 320), (N400, 380 450 F 3). G N2

(F & P , 2008), 15 (Fz, F3, F4, FCz, FC3, FC4, Cz, C3, C4, CPz, CP3, CP4, Pz, P3, P4), : Fz, F3, F4; : FCz, FC3, FC4; : Cz, C3, C4; : CPz, CP3, CP4; : Pz, P3, P4). ANOVA N2 N400, ( ), ( ), (, , - , ,) N2 BANOVA

2.7 T u y a ay

I ( ) EEG EEG ( ) EEG ( ) M G 4

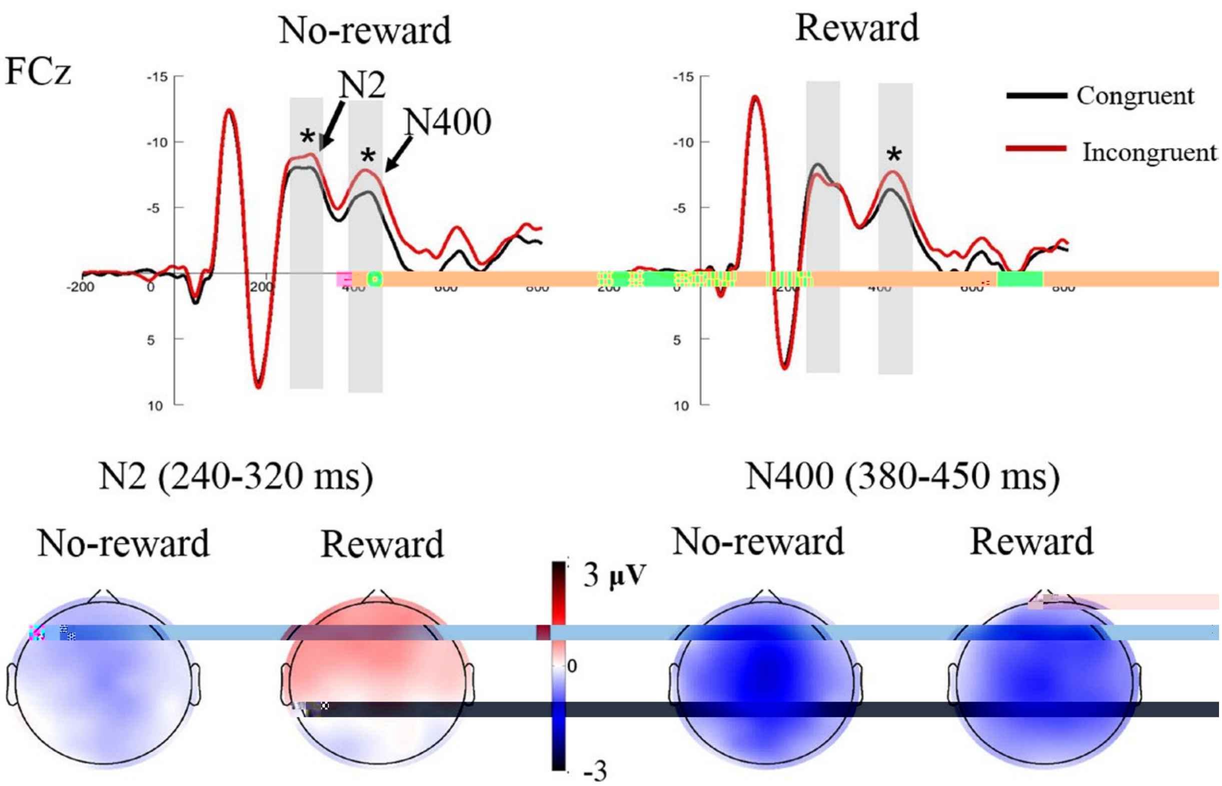

FIGURE 3 : E P ( ) ( ) FCz. N2 N400 . I , N2 N400 (. .,). I , N400 (*$p < .05$). B : N2 ; 240 320) N400 (380 450)

(O , F M & , 2011). 2 30 Hz 1 Hz 700 1,500 10 E (. ., 200 0). F (C & F , 2014; C , 2014), (F & , 2011; B ., 2014). B F (M & O , 2007) 6 8 Hz 200 600 (C & D , 2013; H ., 2008; J ., 2015; N , I , & , 2011) (Fz, F1, F2, F3, F4, F5, F6, FCz, FC1, FC2, FC3, FC4, FC5, FC6, Cz, C1, C2, C3, C4, C5, C6). *t* . D *t* A (0.05) *t* . M 5,000. F *t* (H M , & , 2013; ., 2015), 1,500 1,000 1,000 800 (M & O , 2007) 10 12 Hz 800 0 (CPz, CP1, CP2, CP3, CP4, CP5, CP6, Pz, P1, P2, P3, P4, P5, P6, POz, PO3, PO4, PO7, PO8, Oz, O1, O2)

3 RESULTS

3.1 B

3.1.1 E

A F 2 ( ), ANOVA , $F(1, 24) = 7.538$, $p = .011$, $\eta_p^2 = .24$, (3.9% 2.8%). N

3.1.2 RT

A F 2 ( ), ANOVA , $F(1, 24) = 22.74$, $p < .001$, $\eta_p^2 = .49$, (495 560). $F(2, 48) = 2.86$, $p = .067$, $\eta_p^2 = .11$. H , B ($BF_{10} = 0.084$) . I , , $F(2, 48) = 4.089$, $p = .023$, $\eta_p^2 = .15$.

, ANOVA . F , $F(2, 48) = 4.402$, $p = .018$, $\eta_p^2 = .16$. P (553 569 $p = .041$), (560 553 $p = .241$) (560 569 $p = .443$). F , ANOVA , $F(2, 48) = .19$, $p = .832$, $\eta_p^2 = .01$. , . A , . ($p < .001$).

O ( ) . , , . . I (B , C & A , 2010). ,

. A 2 ( ) × 2 ( ) × 3 (c c) ANOVA c , $F(1, 24) = 24.178$, $p < .001$, $\eta_p^2 = .502$, , $F(1, 24) = 21.163$, $p < .001$, $\eta_p^2 = .469$. M , ac ca , $F(1, 24) = 8.737$, $p = .007$, $\eta_p^2 = .267$. N c ac ac ca c . c (6.1% 3.4%, $t = 4.434$. $p < .001$), (1.5% 1.1%, $t = .986$, $p = .334$). c acc ac cc c acc ac c c c , c c 2 ( ) $t =$ =0.487), ()-240( )-) .986, N2 c -0.6 ( ) c ()2

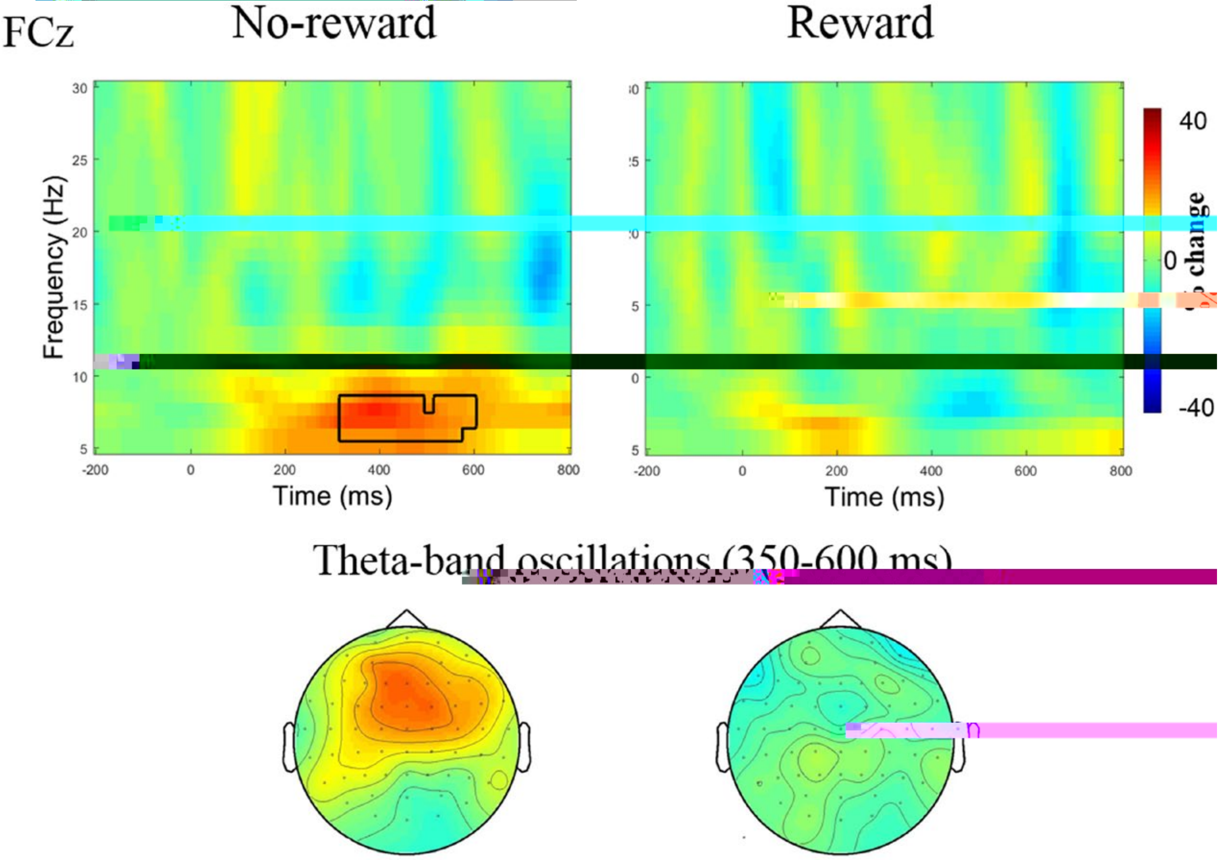

FIGURE 4 ... (200 0 ...) ... : O... ... 0 ... 800 ... FCz. B ... (. ., ...), ... B ... : ... (350 600 ...)

... = 2719.28, p = .018), ... (142.98 ... 122.75% ...). F ... Fz, F1, F2, F3, F5, FCz, FC1, FC2, FC3, FC5, Cz, C1, C2, C3, C4, ... C6 ... 6 ... 8 Hz ... 350 ... 600 ... = 1479.68, p = .049), ... (7.1 ... 18.61% ...).

3.3.2 P ... 8 ...

... t ... (p > .1), ...

4 DISCUSSION

... B ... (B ... & B ..., 2015; K ... ., 2017; P ... & P ..., 2011; ... ., 2015). B ... E P ... N2, N400, ... I ... N2 ... N400 ...

E P N2 c c c . P N2 200 400 - (D , A , McK , & , 2016; L ., 2014; N ., 2011; & C , 2002; ., 2004). F , C (2002) ACC . N2 c - , c c . ACC N2, . B K K (2010) N2 c 230 - N2 c c N2 c . CEEG - (K D , & E , 2009; ., 2015; , , & J , 2015). . (2015), - . F , N2 c - . I N2 - N2 . , N2 , N2 . B , N2. I , N2 - . N2 N2 N2 - (F & P , 2008). F P (2008) N2 c - N2 . I , , Mac , K (2000) N2 20% , N2 - . G

N2 N2 , , N2 c , N2 . - - N2 c .

E P N400, N400 - A - N400 c (K & F , 2000) (G & K 2003) c P N400 - (M ., 2004; , D , O , & E , 2008; ., 2014). F - , M . (2004) , - E P 400 - I , , N400 , N2 N2 . : (-) , , (G & K , 2005; L , H & K , 2002), N400. I . N E P - (N2 N400) (. .,).

O - . P - , , , c. (C & F , 2014; C , 2014; C & C , 2011; C & D , 2013; H ., 2008; J ., 2015; N ., 2011; ., 2001; ., 2017; & , 2010). N . (2011), , - - , , / . (FC , 200 300

[illegible]

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[illegible] (973 [illegible]: 2015CB856400), [illegible] (31470979). [illegible]

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